NEUROLOGIC HEALTH

Acrolein and Neuro Disorders

Neurologic disorders are among the leading causes of death and illness in the United States. Their causes are poorly understood, but one of the emerging suspected culprits is the substance acrolein, which tends to be significantly elevated in the brains or spinal cords of people who have Alzheimer disease, Parkinson disease, amyotrophic lateral sclerosis (ALS), and other neurologic disorders.[1–4] A new study adds multiple sclerosis (MS) to the list of disorders potentially affectedA by this substance.[5]

Acrolein is produced naturally in the body as a by-product of membrane lipid peroxidation. It also occurs in combustion by-products such as vehicle exhaust, industrial emissions, oil- and coal-fired power plant emissions, cooking fumes, and the smoke from burning cigarettes, wood, and plastics. It's used as a biocide and to manufacture other chemicals and products such as chemical weapons. The U.S. Environmental Protection Agency (EPA) has determined the ubiquitous pollutant is a major source of respiratory damage.[6] But information on the neurologic effects of environmental acrolein is scant.

In the new study, Riyi Shi of Purdue University and colleagues injected mice with substances known to induce experimental autoimmune encephalomyelitis, an animal model for MS.[5] Within 2 weeks acrolein–lysine adduct levels in the spinal cord began to rise, peaking at 65% higher than in controls at about day 20. At the same time, the mice began to display significant muscle control problems. Treatment with the acrolein-scavenging substance hydralazine reduced those effects to a great although not significant degree. The researchers also detected significant mitigation of damage to the myelin sheath by hydralazine.

Shi and colleagues say their study provides the first evidence that endogenous acrolein plays a key role in MS. Shi says it's plausible that environmental acrolein can act in the same general way: "There's no reason not to believe that the same type of damage could occur."

Richard LoPachin, a neurochemist and director of research at Montefiore Medical Center in New York, partially agrees. "Because acrolein is highly reactive with proteins at the site of exposure, it has limited distribution in the body and, therefore, limited access to the brain," he says. But acrolein is just one of many type-2 alkenes, a large family of environmental and food contaminants that includes acrylamide, methyl vinyl ketone, methyl acrylate, and 4-hydroxynonenal. LoPachin says type-2 alkenes share a common mechanism of action at nerve terminals in the brain, and he thinks the combined effects of these substances could contribute to some neurologic disorders.

Robert Kavlock, director of the EPA National Center for Computational Toxicology, says acrolein's physical properties make it difficult to assess the compound using the agency's ToxCast™ high-throughput chemical screening program using currently available technology.[7] But pinning down the causes of these neurologic disorders could help millions of people. In the United States alone, about 5.3 million people have Alzheimer disease,[8] about 1.5 million have Parkinson disease,[9] about 400,000 have MS,[10] and about 30,000 have ALS.[11]

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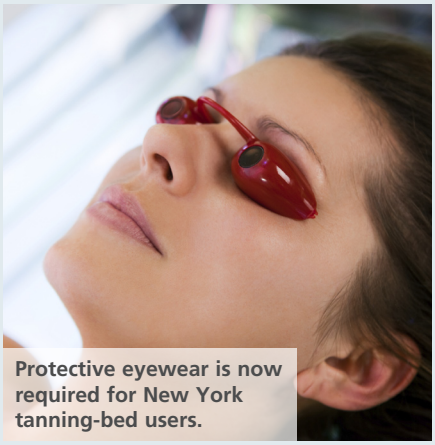
The Beat | by Erin E. Dooley

NY State Tanning Bed Regs

Newly implemented regulations on indoor tanning salons put New York State in the company of almost a dozen states by restricting indoor tanning for children.[1] New York children under age 14 may no longer use such facilities, and older teenagers must have signed parental consent. Adults must acknowledge they are aware of the hazards of indoor tanning and receive instruction in the use of tanning devices. Among other requirements, tanning facility operators in New York State must provide free protective eyewear to customers and ensure customers use it.



Protective eyewear is now required for New York tanning-bed users.

Air Filtration Devices for Port Community Schools

California's South Coast Air Quality Management District has approved the installation of high-performance air filtration devices at 47 schools in Wilmington, a community heavily polluted by shipping and transport activity at the Port of Los Angeles.[2] The decision follows a demonstration project showing the devices removed up to 90% of diesel and ultrafine particles from air inside the classrooms. Funding for the project comes from a settlement with the City of Los Angeles and community groups to mitigate environmental impacts of the TraPac Container Terminal Expansion Project at the Port of Los Angeles. The devices will be installed this spring.

Los Angeles Harbor, near Wilmington.

Tap Water and Hypospadias

Inconclusive evidence to date has suggested a potential link between exposure to trihalomethanes (THMs), a tap water disinfection by-product, and hypospadias, a

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